

Information entropy method and the description of echo hologram formation in gaseous media

Garnaeva G., Nefediev L., Akhmedshina E.

Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

© 2018 Astro Ltd. The effect of collisions with a change in velocity of gas particles, on the value of information entropy, is associated with the spectral structure of the echo hologram's response, where its temporal form is considered. It is shown that collisions with a change in gas particle velocity increase the 'parasitical' information, on the background of which the information contained in the temporary shape of the object laser pulse is lost.

<http://dx.doi.org/10.1088/1555-6611/aa9815>

Keywords

collisions with the change of velocity of gas particles, differential information entropy, echo hologram, information recording

References

- [1] Nefediev L A 1985 Peculiarities of the formation and conversion dynamic echo holograms in gases Opt. Spectrosc. 58 607-11
- [2] Evseev I V, Rubtsova N N and Samartsev V V 2009 Photon echo and phase memory in gases Izv. Kazan. Gos. Univ. Kazan. 151 217-486
- [3] Lvovsky A I, Sanders B C and Tittel W 2009 Optical quantum memory Nat. Photon. 3 706
- [4] Heshami K, England D G, Humphreys P C, Bustard P J, Acosta V M, Nunn J and Sussman B J 2016 Quantum memories: emerging applications and recent advances J. Mod. Opt. 63 2005
- [5] Shannon C E 1948 A mathematical theory of communication Bell Syst. Tech. J. 27 623-56
- [6] Dmitriev V I 1989 Applied information theory: Proc. for stud. Universities on spec. 'Automated systems of information processing and control' Mosc.: Vyssh. wk. 320
- [7] Jahnke E and Emde F 1967 Amount of information and entropy of segments of stationary Gaussian processes Probl. Inf. Trans. 3 1-17
- [8] Griffen N S and Heer C V 1978 Focusing and phase conjugation of photon echoes in Na vapor Appl. Phys. Lett. 33 865-6
- [9] Akhmedshina E N, Nefediev L A and Garnaeva G I 2015 Effect of collisions on the form of stimulated photon echo in a gas J. Appl. Spectrosc. 82 669-72
- [10] Kikoin A I and Kikoin I K 1976 Molecular Physics (Moscow: Nauka)